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TRANSMITTAL OF APPEAL BRIEF

Docket No. 00152-00268-USU

In re Application of: Daniel D. Friel, Jr. et al.

Application No.	Filing Date	Examiner	Group Art Unit
10/803419-Conf. #5873	March 18, 2004	H. Shakeri	3723

Invention: PRECISION MEANS FOR SHARPENING AND CREATION OF MICROBLADES ALONG CUTTING EDGES

TO THE COMMISSIONER OF PATENTS:

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Dated: September 11, 2006

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Appeal Brief Transmittal (1 page)
Appeal Brief (original)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Daniel D. Friel, Sr., et al.

Application No.: 10/803,419

Filed: March 18, 2004 Art Unit: 3723

For PRECISION MEANS FOR SHARPENING AND CREATION OF MICROBLADES ALONG CUTTING EDGES Examiner: Hadi Shakeri

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APPEAL BRIEF

This is an appeal pursuant to 35 USC §134 from the Examiner's final rejection in the Office Action of January 12, 2006. That final rejection was appealed and subsequent to appellant filing the appeal brief prosecution was reopened in an Office Action dated June 30, 2006 wherein claims 63-75, 78, 83-84 and 86-87 were rejected. This appeal is directed to the rejection of those claims.

I. THE REAL PARTY OF INTEREST

The real party in interest is EDGECRAFT CORPORATION, assignee of the inventors' entire interest.

II. RELATED APPEALS AND INTERFERENCES

None.

III. THE STATUS OF THE CLAIMS

Claims 63-88 are pending. In the final rejection of January 12, 2006, Claims 81-82 were allowed. Claims 79, 80 and 88 were indicated as containing allowable subject matter. The remaining claims were rejected. In that rejection, however, Claim 79 was also included although, as noted, it had been grouped with the "allowable" claims. In the Office Action of June 30, 2006, wherein prosecution was reopened Claims 77, 79, 80 and 85 were withdrawn from further consideration as being drawn to a non-elected species. Claims 81-82 were allowed. Previously rejected Claim 76 was no longer included in the rejection, but was grouped with Claim 88 as being "allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112,2nd paragraph, set forth in this

Office action and to include all of the limitations of the base claim and any intervening claims". Since there was no rejection under 35 U.S.C. 112 in the Office Action, it is assumed that these dependent claims were considered allowable if written in independent form.

IV. STATUS OF AMENDMENTS AFTER FINAL

None.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following is a presentment of rejected independent claims 63 and 83 and of dependent claim 64. Thus, claims 63, 64, and 83 are being argued as separately patentable. In the following presentment of these claims the claims have been modified to indicate in parentheses support for each recitation in the specification and drawings.

63. A knife edge conditioning apparatus (Figures 11-20) for manually modifying the physical structure along an elongated edge of a stroked knife blade ("1"), the blade having two faces ("3") that at their terminus have been sharpened forming two edge facets ("2") that intersect to create the elongated edge at the junction of the two facets (page 7, line 25-29; Figures 11 and 16A), said apparatus comprising at least one precision knife

guide ("7", "17") having a planar knife face contacting surface (page 16, line 19-23; element "7" of Figure 12; element "17" of Figures 13-14) along which the face ("3") of the blade can be stroked in sustained moving contact with a hardened surface ("5") of an object ("13") (page 17, line 5) located adjacent to and at an angle to said guide surface (Figure 11), said object ("13") being non-motor-driven (page 18, lines 18-20), said hardened surface ("5") being of non-planar shape (page 19, lines 7-13) to maintain sustained contact with and locally stress and fracture the edge of the blade at the location of contact with said hardened surface on repeated stroking to create a microscopic serration along the edge (page 5, line 5 - to last line; page 9, lines 18-21; page 10, lines 3-16; page 20, lines 4-16; page 27, line 17 to page 28, line 2), and said hardened surface ("5") being substantially free of abrasive particles and free of sharp edges characteristic of abrading, skiving and metal removing tools (page 11, line 19 to page 12, line 2; page 22, lines 24-30; page 26, lines 15-16).

64. An apparatus according to Claim 63 where said hardened surface has an arcuate shape at said location of contact (page 19, lines 7-13).

83. A method for manually modifying the physical structure along an elongated edge of a knife blade ("1") which has two

faces ("3") that at their terminus form two edge facets ("2") that intersect to create the elongated edge at the junction of the two facets (page 7, lines 25-29; Figures 11 and 16A) comprising providing at least one precision knife guide ("7", "17") having a planar knife face contacting surface (page 16, lines 19-23; element "7" of Figure 12; element "17" of Figures 13-14), providing near the at least one precision knife guide a non-motor-driven object ("13") (page 18, lines 18-20) having a hardened surface ("5") which is substantially free of abrasive particles and free of sharp edges characteristic of abrading, skiving and metal removing tools (page 11, line 19 to page 12, line 2; page 22, lines 24-30; page 26, lines 15-16), the hardened surface having a hardness at least equal to the hardness of the knife blade (page 19, lines 7-10), repeatedly placing each face of the knife blade against the planar knife face contacting surface of the at least one precision knife guide (page 8, line 23 to page 9, line 5), maintaining each face alternately in sustained moving contact with the face contacting surface as each facet is stroked against the hardened surface at a location of contact where the hardened surface is of non-planar shape (page 8, line 23 to page 9, line 5; page 19, lines 7-13), and maintaining sustained contact between each facet and the hardened surface on each stroke to locally stress and fracture the edge of

the blade on repeated stroking to create a microscopic serration along the edge (page 5, line 5 - to last line; page 9, lines 18-21; page 10, lines 3-16; page 20, lines 4-16; page 27, line 17 to page 28, line 2).

VI. GROUNDS OF REJECTIONS TO BE REVIEWED ON APPEAL

The grounds of rejection for appeal are: (1) the rejection of claims 63-75, 78, 83, 84, 86 and 87 under 35 U.S.C. 103(a) as being unpatentable over Edling (4,285,253) in view of Leong (2,461,690) and/or Leong in view of Edling and (2) the rejection of claims 63-68, 70-75, 78, 84, 86 and 87 under 35 USC 103(a) as being unpatentable over Friel (Des. 368,217) in view Edling. [Dependent claim 69 was further rejected as unpatentable over Friel as modified by Edling as applied to claim 63 and further in view of Fletcher (4,450,653). The rejection of dependent claim 69 is not being separately argued in that, if claim 63 is found to be patentable, then the rejection of claim 69 would be moot.]

VII. ARGUMENT

A. The Invention in General

During the prosecution two declarations were submitted by applicant, Daniel D. Friel, Sr. Copies of these declarations are

in Appendix II. The first declaration ["Friel Declaration"] was filed on or about August 11, 2005. The second declaration ["Friel Second Declaration"] was filed on or about December 12, 2005, and accordingly both declarations are part of the prosecution.

Mr. Friel has a Bachelor of Science degree in Chemical Engineering from Johns Hopkins University. [Friel Declaration, paragraph 2] He began his employment with E.I. duPont de Nemours & Company ("DuPont") in 1942, working on the Manhattan Project at the University of Chicago and remained employed by DuPont until his retirement in 1982, when he had the position of Worldwide Director Instruments Products Division. [Friel Declaration, paragraph 3] After retirement from DuPont he formed and is now Chief Executive Officer of Edgecraft Corporation ("Edgecraft"), the assignee of this application. The original and largest selling line of products by Edgecraft relates to various types of sharpeners. From the start up of Edgecraft in 1985, Edgecraft sharpeners have enjoyed a worldwide reputation in the industry for technical innovations and consistently high quality. [Friel Declaration, paragraph 4] Mr. Friel includes among his qualifications being a named inventor on 22 U.S. utility patents and 10 U.S. design patents, specifically for various types of sharpeners. The first patent he applied for relating to

sharpeners was on March 12, 1984. Clearly, Mr. Friel is an expert in the field of sharpening devices. [Friel Declaration, paragraphs 5-6]

As explained by Mr. Friel there are three common techniques used for sharpening tools, such as knives, namely (a) abrasive sharpening, (b) steeling and (c) skiving. [Friel Declaration, paragraph 7] The intent in abrasive sharpening is to obtain an edge structure which is V-shaped or a modified V-shape where the resulting edge is as geometrically perfect as possible. The abrasive sharpening members are intended to rapidly remove significant amounts of material so as to create specific geometric shapes along or across the facets that create the sharpened edge. [Friel Declaration, paragraph 8] The second technique is steeling and there are widely varying perceptions of this technique. It is generally believed that a non-abrasive manual steel may be used to straighten the burr created by abrasive sharpening and to align the burr (which is an extension of the edge) with the central axis of the edge or to remove the burr. The conventional steel does not have an abrasive coating on its surface, but is constructed entirely of hardened material. [Friel Declaration, paragraph 8] The skiving techniques involve forming a new edge by removing in entirety the surface of old facets and replacing them with new facet surfaces commonly

created at a poorly defined angle. Skiving could be analogized to wood planing where in skiving one stroke can remove an entire thin film of metal from the facet surface. [Friel Declaration, paragraph 10]

As Mr. Friel also points out, before the time of his involvement with the developing of sharpeners, and at least as early as 1984, he had been aware of steeling techniques. It was not until decades later, however, when he realized that if a precision guide were associated with a hardened surface (such as used in steeling techniques) and if the angle could be consistently controlled stroke after stroke a unique blade edge would be created. Such blade edge would be one having relatively uniformly sized and spaced microserrations. This was a surprising discovery to him because to the best of his knowledge there was no realization that a microserrated blade edge could be obtained by steeling. Mr. Friel points out that the general intent of abrasive sharpeners is to obtain a perfectly geometric V-shape. The basic intent of manual steeling is generally believed to be to straighten or remove burrs that result from abrasive sharpening. The basic intent of skiving is to remove on each stroke an entire layer or film of metal. None of these techniques was intended to form a microserrated edge. [Friel Declaration, paragraph 11]

The present invention is accordingly directed to something entirely new in this field, namely, to provide a unique technique for sharpening. Because of this uniqueness, a new designation was used, referred to in the specification and claims as "conditioning" in order to emphasize that the new apparatus differs from both abrasive sharpening and conventional steeling and that the resulting conditioned edge is repeatedly reproducible and structurally very different from edges obtained in abrasive sharpening and steeling. Unlike abrasive sharpening, the present invention does not utilize abrasive materials to achieve its result. Unlike steeling the present invention incorporates highly precise structure for controlling on every stroke the angle between the facet along the knife edge with the surface of the hardened material. The present invention provides a fundamental difference from these prior art techniques in that the present invention creates a novel, highly reproducible and unexpected row of microscopic serrations along the knife edge. The uncontrolled angles and inconsistent forces involved in conventional manual steeling prevents such consistent and reliable formation of this new highly desirable edge. Conventionally, steeling has been used after the knife edge has been sharpened for the purpose of straightening, realigning and smoothing the edge and also to remove burrs. The present

invention, in contrast, creates a relatively uniform and novel row of microscopic teeth along the edge and recreates the teeth when the edge is dulled from use. The physical phenomena responsible for the creation of these microscopic serrations or teeth along the knife edge is a carefully controlled and repetitive localized bending of the edge back and forth along the abrasively sharpened edge especially after the burr is removed. This repeated bending in opposite directions causes stress hardening and enbrittlement of the metal along the edge itself which causes cracks to occur perpendicular to the edge and fracturing of small sections of metal between the cracks so formed. Small sections of metal then fall off between the cracks leaving the tooth-like microscopic serration along the edge. [Friel Declaration, paragraph 12] Figure 7 illustrates such a microserrated edge.

Among the main features of the invention are the combination of a planar guide surface adjacent to and at an angle to a static or non-motor-driven object having a hardened surface. The hardened surface is of non-planar shape where it contacts the edge of the blade, to locally stress and fracture the edge of the blade by repeated controlled stroking to thereby result in a microscopic serration of the blade edge. [Friel Declaration, paragraph 13]

Significantly, not one item of prior art cited by the Examiner refers to obtaining a microserrated blade edge, much less teaching the structure that controls the stroking action - stroke after stroke - to assure the repeated creation of such edge. This confirms the pioneering nature of this invention.

B. The Rejecting References

1. Edling U.S. 4,285,253

Edling relates to a mechanical steel wheel for sharpening blades. Specifically, Edling uses motor driven disks, 11,24, each having a smooth peripheral edge 12. (Col. 3, lines 24-28, 57-66; Figures 1-2) The intent of the device is to sharpen "the blade to a smooth fine finish". (Col. 3, lines 31-32) Edling also discloses the device as including knife guiding means 16 adjacent to each disk. (Col. 3, lines 35-39; Figures 1-2) Significantly, as regards the present invention, the knife guiding means 16 of Edling has rounded [not planar] edges 34. (Figures 3-5) Edling specifically states "It is preferred that the disks 11 and 24 have rounded peripheral edges 12 which in conjunction with the rounded sides 34 of the knife-guiding means 16 (as shown in FIGS. 3 and 4) enable the blade 18 being sharpened to be drawn through the knife receiving spaces 28 at a variety of angles instead of only at right angles to the disks 11

and 24 as would be required if no rounding was used". (Col. 4, lines 46-53)

Figures 2 and 6 of Edling illustrate the actual use of the Edling device where the knife blade 18 clearly does not have the blade face in contact with any guide surface and particularly with any planar guide surface. As a result, Edling does not use a precision knife guide in order to assure that the face of the blade would be moved precisely at the same angle each and every time it is stroked.

2. Leong U.S. 2,461,690

Leong relates to a knife sharpener having a base member provided with a rod 2 and a handle 3 which may be held when sharpening a knife. A sharpening steel or hone 4 is formed integrally with the rod 2. (Col. 1, lines 27-33; Figure 2) Mounted on the base to the side of the rod 2 are a pair of freely rotatable abrasive wheels 9,10. (Col. 1, lines 36-41; Figures 1-3) In operation, a knife to be sharpened is placed between the abrasive wheels as indicated by the dotted lines 15 in Figure 3 and pushed back and forth between the wheels a few times. (Col. 1, line 55 to Col. 2, line 3) Next, "when the blade is sharpened to a desired degree, it is finished by pulling it across one side of the hone 4 and the wheel 9 as indicated by the dotted lines 16

and then across the other side of the hone and the wheel 10 as indicated by the dotted lines 17". (Col. 2, lines 22-27; Figure 3)

3. Friel Des. 368,217

The Friel design patent illustrates a knife sharpener. Because this is a design patent there is not a detailed explanation of the various components of the knife sharpener. With reference to Figures 1-2 what is illustrated is that in the central portion of the sharpening section there are two rollers which would function as guides for the knife to dispose the blade in the shaded or stippled V-shaped area below the rollers. The V-shaped area represents the abrasive sharpening portion of the sharpener as indicated by the shading or stippling. With this arrangement both facets of the blade are simultaneously sharpened. [Friel Second Declaration, paragraph 8]

C. The Separately Argued Claims

1. Claim 63

Claim 63 was rejected over different combinations of prior art; specifically, under 35 USC 103(a) as unpatentable (a) over Edling in view of Leong and/or (b) Leong in view of Edling and (c) over Friel in view of Edling.

Claim 63 relates to a knife edge conditioning apparatus which embodies the structure for being able "to create a microscopic serration along the edge". The structural features of claim 63 include (1) "at least one precision knife guide having a planar knife face contacting surface"; (2) "a hardened surface of an object located adjacent to and at an angle to said guide surface"; (3) "said object being non-motor-driven"; (4) "said hardened surface being of non-planar shape" and (5) "said hardened surface being substantially free of abrasive particles and free of sharp edges characteristic of abrading, skiving and metal removing tools".

a. Rejection over Edling in view of Leong and/or Leong in view of Edling

In rejecting claim 63 over Edling in view of Leong, the Examiner asserted that Edling meets all of the limitations of claim 63 and that "Edling discloses a superior finish by using steel, whether manual or mechanical (05:57-60) and discloses a preferred embodiment of mechanical means". Leong was relied upon when modifying Edling for teaching "sharpening a knife by manual means". The combination of Edling and Leong was considered to have been obvious "to modify the invention of Edling by using a manual means as taught by Leong, e.g., to save cost".

As regards the rejection over Leong in view of Edling, the Examiner concluded that "Leong discloses a sharpening apparatus and method meeting all of the limitations of claims 63 and 83 except for disclosing a harden object. Edling teaches achieving a fine smooth finish by a non-grinding means of utilizing a harden object." The Examiner concluded that it would have been obvious "to modify the invention of Leong while using a harden object as taught by Edling, e.g., for a superior finish".

(i) Planar guide surface

At the outset it should be clear that neither Edling nor Leong includes "at least one precision knife guide having a planar knife face contacting surface" as recited in claim 63. The importance of this feature is to assure that on each and every stroke of the knife edge against the hardened surface of the object the same angle will be maintained which results in the blade edge having relatively uniformly sized and spaced microserrations. Such high precision control of the angle on every stroke can not be achieved by either Edling or Leong.

Edling specifically discloses "rounded sides 34 of the knife-guiding means" (Col. 4, line 48) which would "enable the blade being sharpened to be drawn through the knife receiving spaces 28 at a variety of angles instead of only at right angles

to the disks 11 and 24, as would be required if no rounding was used." (Col. 4, lines 49-53) Accordingly, not only does Edling fail to teach the provision of a knife guide having a planar contacting surface, but in fact Edling specifically teaches away from that structure by emphasizing the criticality of having "rounded sides" for the knife guiding means.

Similarly, Leong is devoid of any disclosure of at least one precision knife guide having a planar guide surface. In Leong, as shown in Figure 3, the disposition of the knife when used in conjunction with the abrasive wheels 9 and 10 is indicated by the reference numerals 15,15a. In that condition, the knife blade simply makes contact with the abrasive wheels. There is no guide structure. The other condition of use is indicated by the reference numerals 16,17 where the knife blade contacts both an abrasive wheel 9 or 10 and the hone 4. Significantly, both the abrasive wheels and the hone have rounded surfaces, not the planar surface recited in claim 63. Accordingly, if either an abrasive wheel or the hone is considered as a guide member in Leong, then neither of such structures has a planar contacting surface. As Mr. Friel observed in paragraph 5 of his Second Declaration "the angle of the knife face and the angle of the knife facet relative to the steel are uncontrolled as taught by Leong. Only the line of the edge line itself is positioned.

There is no angle control of the facets. It is clear that Leong exercises no angle control for the facet during either sharpening or finishing." [Paragraph 5 of the Friel Second Declaration which includes further discussion of the lack of angle control by Leong.]

(ii) Microserrated edge

The differences between the Edling and Leong arrangements as compared to claim 63 are not surprising when considering the differences in intended results. Edling uses steeling techniques for achieving "a fine finish" (Col. 5, line 55) which would conventionally be expected to be achieved with a steeling device. Thus, Edling compares the results from the "mechanical" (i.e. motor driven disks used by Edling) with the conventional manual steel concluding that "the results from this type of sharpener are comparable to the use of a manual steel for producing a smooth fine-finished sharpened blade". (Col. 5, lines 51-59) Edling repeatedly refers to the resulting blade edge in such terms as "fine finish" or "smooth finished edge" (e.g. Col. 5, lines 45, 55, 59, 66). Nowhere does Edling suggest an intent to achieve or the actual achieving of an edge which is microserrated.

As regards Leong, the knife sharpener is a combination sharpener which uses abrasive wheels 9,10 and a honing or sharpening steel 4. In use a knife would first be sharpened by the abrasive wheels and then "when the blade is sharpened to a desired degree, it is finished by pulling it across one side of the hone 4 and the wheel 9 as indicated by the dotted lines 16 and then across the other side of the hone and the wheel 10 as indicated by the dotted lines 17". (Col. 2, lines 22-28) Again there is no suggestion of any intent to achieve or of the actual achievement of a knife edge having microserrated teeth as would result from the apparatus defined in claim 63.

(iii) Non-motor-driven object

A further significant difference between the invention of claim 63 and Edling is that the Edling sharpener specifically uses motor operated disks which are rotated by the drive means 14. (Col. 3, line 28; FIG. 1) As a result there would be no motivation to modify Edling by replacing the mechanical or motor operated disks with manual steels as in Leong. The lack of motivation is clear by the disclosure in Edling wherein Edling specifically recognizes the existence of manual steels but instead intentionally uses mechanical or motor driven disks and

notes the comparable results with manual steels. (Col. 5, lines 51-58)

b. Rejection over Friel in view of Edling

In this rejection the Examiner concludes that Friel meets all of the limitations of claim 63 "except for disclosing a hardened object for the sharpening tool" and Edling is relied upon for that feature with the conclusion that it would be obvious "to modify the invention of Friel by substituting the sharpener with a harden object as taught by Edling to obtain a fine smooth finish".

The deficiencies of Edling as regards claim 63 are discussed above.

Friel exemplifies an abrasive sharpener which uses a knife guide in the form of a pair of rollers that would in combination achieve a planar guide surface. But, this guide surface of Friel is intended to position the knife blade so that it will contact the extended length abrasive surface and form a V-shaped edge. As is characteristic with abrasive sharpeners, Friel lacks the disclosure of having the edge of the blade be in contact with a hardened surface of an object wherein that hardened surface is "substantially free of abrasive particles..." This is a

significant difference between claim 63 and conventional abrasive sharpeners. This difference lies at the heart of the present invention, namely, the recognition that the combination of at least one precision knife guide having a planar guide surface for disposing the edge of a blade against the hardened surface of a non-motor driven object will result in maintaining "sustained contact with and locally stress and fracture the edge of the blade at the location of contact with said hardened surface on repeated stroking to create a microscopic serration along the edge." Moreover, as illustrated in Figures 1-2 of Friel, each side of the V-shaped abrasive surface is planar, whereas claim 63 defines "said hardened surface being of non-planar shape". Thus, the purpose of the combination of structural features defined in claim 63 is to achieve a type of edge distinctly different from what is intended to be achieved by prior art devices such as Friel - which is an abrasive sharpener - or by prior art devices such as Edling - which uses steeling techniques. Even the conclusion reached by the Examiner as why such hypothetical combination of Friel and Edling would be made highlights the difference in the edge which is sought by Friel, sought by Edling and sought by claim 63. The examiner hypothesizes that it would have been obvious to combine Friel and Edling "to obtain a fine smooth finish". What is intended by the structure defined in

claim 63 is not to obtain a fine smooth finish, but rather "to create a microscopic serration along the edge". Accordingly, there is nothing in the prior art relied upon to even remotely suggest the motivation for making the hypothetical combination and modifications, particularly when the end result sought by the individual items of prior art not only differ from each other, but more importantly differ from what is achieved by the apparatus of claim 63.

c. The hypothetical combinations do not result in the structure of Claim 63

Clearly there is no motivation to make the hypothetical combinations suggested by the Examiner. This is especially so where the types of edges sought by the prior art not only differ from each other (i.e. an edge resulting from abrasive sharpening or an edge resulting from steeling), but also where that edge is totally different and distinct from the edge resulting from claim 63 - - a microserrated edge.

But even if the references were combined as suggested by the Examiner, such combinations would still differ from claim 63. In one instance claim 63 is rejected over Edling in view of Leong. The Examiner concludes "It would have been obvious...to modify the invention of Edling by using a manual means as taught by Leong,

e.g. to save cost". The result of such modification would simply mean that the disks 11 and 24 would no longer be motor driven. Such modified device would still lack the planar precision guide and care would not be taken to assure that in operation of such modified device a microserrated edge would result.

Alternatively the Examiner concludes "It would have been obvious...to modify the invention of Leong by using a harden object as taught by Edling, e.g. for a superior finish." What Leong teaches is that "when a blade is sharpened to a desired degree, it is finished by pulling it across one side of the hone 4...". (Col. 2, lines 22-27) Thus, if the Examiner's suggestion were followed in order to obtain "a superior finish", the hone 4 which is already a sharpening steel (Col. 1, lines 32-33) would become the "harden object" suggested by Edling. But, this is essentially the structure Leong already has which does not anticipate claim 63. Such Leong structure would still, for example, lack a precision knife guide, particularly one having a "planar knife face contacting surface" as discussed, supra. As with Edling, there would be no care taken to provide a hypothetically modified Leong structure for obtaining a microserrated edge. To properly combine prior art there must not only be motivation but also an expectation of success. If the motivation for the combination were for the purpose of obtaining

a superior finish, namely the finish expected from steeling, and if some other type of edge resulted (i.e. a microserrated edge), there would be no expectation of success in obtaining the intended "finish" and such combination would not be made.

Lastly, the Examiner concludes "It would have been obvious...to modify the invention of Friel by substituting the sharpener with a harden object as taught by Edling to obtain a smooth fine finish". The result of this hypothetical modification of Friel would be to make the elongated planar V shaped abrasive surface to be non-abrasive or hardened. Again such hypothetical structure would differ from claim 63 by lacking a "hardened surface being of non-planar shape". Moreover, if such hypothetical combination were made because it was intended "to obtain a smooth fine finish" and some other type of finish resulted, one of ordinary skill in the art would not make the modification since it would lack the expectation of success in achieving the intended fine smooth finish.

d. Secondary Considerations

All of the rejections of claim 63 are based upon obviousness rather than anticipation. Secondary considerations should be taken into account which might negate a conclusion of obviousness. As pointed out in paragraph 21 of the Friel

Declaration the present invention is embodied in two different models commercialized by the assignee, Edgecraft. At the time of its introduction to the trade in April, 2004 there were no other products on the market having a steeling type sharpening member in combination with a precision guide in the manner of the invention as embodied in the commercial models despite the fact that abrasive sharpeners having precision guides and despite the fact that steeling devices were known for many decades. Since the time of its first shipment in July, 2004 to the time of the execution of the Friel Declaration in August, 2005, Edgecraft had sold a total of approximately 10,000 collectively of these models incorporating the invention, in the United States and Europe. Such commercial success in the face of the long known existence of abrasive sharpeners having precision angle guides and of steeling devices, clearly confirms that it would not have been obvious for one of ordinary skill in the art at the time of the present invention to have made the combination of structural features defined in claim 63.

2. Claim 64

Claim 64 is dependent on claim 63 and defines the nonplanar shape of the hardened surface as being "an arcuate shape at said location of contact".

Claim 64 was rejected over the same three proposed hypothetical combinations as claim 63, namely, as obvious over Edling in view of Leong and/or Leong in view of Edling and Friel in view of Edling. The reasons given above with regard to parent claim 63 are incorporated herein.

Claim 64 is being argued as a separate claim, in particular, because of further reasons with regard to the rejection as being obvious over Friel in view of Edling. In making that rejection the Examiner concluded "It would have been obvious...to modify the invention of Friel by substituting the sharpener with a harden object as taught by Edling to obtain a fine smooth finish". The result of such combination would be to make the abrasive surface for the Friel sharpener non-abrasive and instead to use a hardened object as the abrasive surface. This means that the structural elements in Friel would remain the same except that the sharpening member would no longer be abrasive. Claim 64, however, points out that the shape of that surface at the location of contact should be "arcuate". This differs from Friel where each side of the V-shape abrasive member is planar. Thus, even if the sides of the Friel V-shape were no longer abrasive, they would still not be of arcuate shape.

3. Claim 83

Claim 83 is generally the method counterpart of claim 63 and should be allowed for the same reasons as claim 63.

A notable difference between claims 63 and 83, however, is that since claim 83 is a method claim it includes in its method steps "to locally stress and fracture the edge of the blade on repeated stroking to create a microscopic serration along the edge". Thus, in addition to the reasons given above with regard to claim 63, claim 83 should be allowed since clearly none of the references - Edling, Leong, Friel - is intended to obtain a microserrated edge by locally stressing and fracturing the edge on repeated stroking. Indeed, such type of edge is specifically not sought by Edling who repeatedly seeks a "smooth finished edge". (Col. 5, lines 66 and also lines 45, 55 and 59) Similarly, Leong relates to a combined knife sharpener which includes abrasive wheels and a hone. The hone is used so that the blade is "finished after it had been sharpened to a desired degree". (Col. 2, lines 22-27) Nothing in Leong even remotely suggests that such finish should be a microserrated edge. Friel is a design patent for a "knife sharpener" and is an example of a manual knife sharpener which utilizes abrasive sharpening structure as indicated by the shading or stippling in Figure 2.

Such abrasive structure is located in the V-portion below the cylinders. Conventionally, the intent of abrasive sharpeners is to obtain an edge having a V-shape or a modified V-shape where the resulting edge is as geometrically perfect as possible. (Friel Declaration, paragraph 8) It is not an intent to utilize abrasive sharpeners in order to obtain a microserrated edge. Thus, each of the rejecting references notably lacks the method steps resulting in a microserrated edge.

VIII. CONCLUSION

For the reasons submitted above it is respectfully submitted that the Examiner should be reversed in his rejections and that claims 63-75, 78, 83, 84, 86 and 87 should be allowed.

Respectfully submitted,

CONNOLLY BOVE LODGE & HUTZ LLP

By _____

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APPENDIX I

CLAIMS APPENDIX

63. A knife edge conditioning apparatus for manually modifying the physical structure along an elongated edge of a stroked knife blade, the blade having two faces that at their terminus have been sharpened forming two edge facets that intersect to create the elongated edge at the junction of the two facets, said apparatus comprising at least one precision knife guide having a planar knife face contacting surface along which the face of the blade can be stroked in sustained moving contact with a hardened surface of an object located adjacent to and at an angle to said guide surface, said object being non-motor-driven, said hardened surface being of non-planar shape to maintain sustained contact with and locally stress and fracture the edge of the blade at the location of contact with said hardened surface on repeated stroking to create a microscopic serration along the edge, and said hardened surface being substantially free of abrasive particles and free of sharp edges characteristic of abrading, skiving and metal removing tools.

64. An apparatus according to Claim 63 where said hardened surface has an arcuate shape at said location of contact.

65. An apparatus according to Claim 63 where said precision knife guide has an elongated flat surface which comprises said planar knife face contacting surface.

66. An apparatus according to Claim 63 where said object has said hardened surface at two opposite locations, and one of said knife guides being disposed at each of said two opposite locations.

67. An apparatus according to Claim 63 where said hardened surface is the surface of a stationary object.

68. An apparatus according to Claim 63 where said hardened surface is the surface of a rotatable cylindrical object.

69. An apparatus according to Claim 68 where a braking mechanism prevents rotation of said rotatable cylindrical object unless a torque is applied to said cylindrical object in excess of that applied by said braking mechanism.

70. An apparatus according to Claim 63 where said object is adjustable in order that different areas of said hardened surface of said object can be selected as said location of contact.

71. An apparatus according to Claim 63 where said hardened surface of said object is serially grooved with a plurality of grooves at said location of contact, and said grooves being oriented angularly to cross the elongated edge as the edge is moved across said grooved hardened surface.

72. An apparatus according to Claim 63 where said hardened surface has a hardness above Rockwell C-60.

73. An apparatus according to Claim 63 where said apparatus is a conditioning station in a device having a handle outwardly of said station.

74. An apparatus according to Claim 63 where there are at least two linearly aligned of said objects each having said hardened surface, and said knife guide having said planar knife face contacting surface for use with said at least two objects.

75. An apparatus according to Claim 63 where there are two of said knife guides which are parallel to each other with said object between said knife guides.

76. An apparatus according to Claim 63 where said object is mounted on a support member, said knife guide being pivotally mounted to said support member, and adjusting structure controlling the angle of orientation of said knife guide.

77. An apparatus according to Claim 63 where said knife guide comprises at least two aligned rods or rollers which define an extended guide plane, and said extended guide plane being said knife face contacting surface.

78. An apparatus according to Claim 63 where said hardened surface has a surface roughness no greater than 10 microns.

79. An apparatus according to Claim 63 including a physical member to contact the knife blade and apply a force to press the blade against said knife guide as the blade is moved along said knife guide with the blade edge in sustained contact with said hardened surface.

80. An apparatus according to Claim 63 comprising a set of said hardened surfaces and one of said precision knife guides adjacent said hardened surfaces, including an inverted U shaped spring member having cantilevered resilient arms and an

intermediate connection portion, said connecting portion being between said set of hardened surfaces, and each of said arms of said spring member extending downwardly generally along a portion of a respective one of said precision knife guides.

81. In a knife-edge enhancing apparatus for modifying the physical structure along an elongated edge of a knife blade, the blade having two faces that at their terminus have been sharpened forming two edge facets that intersect to create the elongated edge at the junction of the two edge facets, said apparatus comprising at least one precision angle knife guide with which one face of the blade maintains sustained contact in order to guide the elongated edge of the blade into sustained contact with a blade edge contacting member, the improvement being in that in place of a sharpening member having an abrasive surface as the contacting member, the contacting member is a knife-edge conditioning member which is a hardened surface of an object located to position a plane of one adjacent edge facet at a precise predetermined non-zero degree angle B relative to the plane of contact with said hardened surface, there being at least one of said object with said hardened surface disposed at said at least one precision angle knife guide whereby each of the blade faces may selectively be placed against said guide surface of said at least one precision angle knife guide to selectively dispose each of the facets against said hardened surface at said angle B, said hardened surface being sufficiently non-abrasive which in combination with said knife

guide comprises means to repeatedly create and fracture a microstructure along the edge of the blade at the extreme terminus of the edge facets during repeated contact of the facets and said hardened surface to create a microserrated edge, said hardened surface of said object being restrained in a predetermined rest position relative to and adjacent said precision knife guide by a restraining mechanism that applies a restraining force to position said object in said rest position, and said object being displaceable against the force of said mechanism by the force applied by the blade facet contacting said hardened surface of said object.

82. In a knife-edge enhancing apparatus for modifying the physical structure along an elongated edge of a knife blade, the blade having two faces that at their terminus have been sharpened forming two edge facets that intersect to create the elongated edge at the junction of the two edge facets, said apparatus comprising at least one precision angle knife guide with which one face of the blade maintains sustained contact in order to guide the elongated edge of the blade into sustained contact with a blade edge contacting member, the improvement being in that in place of a sharpening member having an abrasive surface as the contacting member, the contacting member is a knife-edge conditioning member which is a hardened surface of an object located to position a plane of one adjacent edge facet at a precise predetermined non-zero degree angle B relative to the plane of contact with said hardened surface, there being at

least one of said object with said hardened surface disposed at said at least one precision angle knife guide whereby each of the blade faces may selectively be placed against said guide surface of said at least one precision angle knife guide to selectively dispose each of the facets against said hardened surface at said angle B, said hardened surface being sufficiently non-abrasive which in combination with said knife guide comprises means to repeatedly create and fracture a microstructure along the edge of the blade at the extreme terminus of the edge facets during repeated contact of the facets and said hardened surface to create a microserrated edge, a predetermined fixed angle C being formed between said guide surface of said knife guide and said plane of contact of said hardened surface, said hardened surface having a hardness above Rockwell C-60, said object being mounted to a support member, said knife guide being pivotally mounted to said support member, and adjusting structure controlling the angle of orientation of said knife guide.

83. A method for manually modifying the physical structure along an elongated edge of a knife blade which has two faces that at their terminus form two edge facets that intersect to create the elongated edge at the junction of the two facets comprising providing at least one precision knife guide having a planar knife face contacting surface, providing near the at least one precision knife guide a non-motor-driven object having a hardened surface which is substantially free of abrasive

particles and free of sharp edges characteristic of abrading, skiving and metal removing tools, the hardened surface having a hardness at least equal to the hardness of the knife blade, repeatedly placing each face of the knife blade against the planar knife face contacting surface of the at least one precision knife guide, maintaining each face alternately in sustained moving contact with the face contacting surface as each facet is stroked against the hardened surface at a location of contact where the hardened surface is of non-planar shape, and maintaining sustained contact between each facet and the hardened surface on each stroke to locally stress and fracture the edge of the blade on repeated stroking to create a microscopic serration along the edge.

84. The method of Claim 83 where there is a single knife guide, and selectively stroking both faces of the blade against the planar face contacting surface of the single knife guide.

85. The method of Claim 83 where there is a hardened surface at two opposite locations with one of the knife guides at each of the two opposite locations, and stroking one of the blade faces against one of the knife guides and the other of the blade faces against the other of the knife guide.

86. The method of Claim 83 including disposing the facet at an angle with respect to the hardened surface of less than 10 degrees during the stroking.

87. The method of Claim 83 wherein the moving edge of the blade is repeatedly wedged against the hardened surface between the

hardened surface and the knife guide surface at the point of contact with the hardened surface.

88. An apparatus according to Claim 63 where said object in a rest position can be displaced by an exerting force exerted by the blade edge against said hardened surface of said object against a predetermined restraining force of a resilient structure that upon release of said exerting force repositions said hardened surface to said rest position.

APPENDIX II

EVIDENCE APPENDIX

FRIEL-105

I hereby certify that this paper, along with any other paper or fee referred to in this paper as being transmitted herewith, is being deposited with the United States Postal Service with sufficient postage as First-Class Mail in an envelope addressed to: Commissioner of Patents and Trademarks, P. O. Box 1450, Alexandria, VA 22313-1450 on this 11th day of August, 2005.

By: [signature]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DANIEL D. FRIEL, SR., ET AL.	
SERIAL NO.: 10/803,419	Art Unit: 3723
FILING DATE: 03/18/04	Examiner: Hadi Shakeri
FOR: PRECISION MEANS FOR SHARPENING AND CREATION OF MICROBLADES ALONG CUTTING EDGES	

Hon. Commissioner of Patents
and Trademarks
P. O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF DANIEL D. FRIEL, SR.

DANIEL D. FRIEL, SR., hereby declares:

1. I am one of the named inventors for the above identified application.

2. I received a Bachelor of Science degree in Chemical Engineering from Johns Hopkins University.

3. In 1942 I began my employment with E.I. DuPont de Nemours & Co. ("DuPont") when I worked on the Manhattan Project, University of Chicago, and

remained employed by DuPont until my retirement in 1982. The last position I held at DuPont was Worldwide Director Instruments Products Division.

4. Upon retirement from DuPont I founded and am now Chief Executive Officer of Edgecraft Corporation ("Edgecraft") which develops and markets lines of kitchen products. The original and largest selling lines of products relate to various types of sharpeners. From the start up of Edgecraft in 1985, Edgecraft now has more than 150 full-time employees and offers over 500 different products. Edgecraft is an innovator of various types of sharpeners, food slicers, waffle makers, beverage brewers and other products. Edgecraft's CHEF'SCHOICE® sharpeners enjoy a world-wide reputation in the industry for technical innovations and consistently high quality.

5. I am a named inventor on numerous United States and foreign patents and patent applications. This includes 22 U.S. utility patents and 10 U.S. design patents specifically for various types of sharpeners. The first patent I applied for relating to a sharpener was on March 12, 1984. I am also a named inventor on patents for other

products of Edgecraft and for many products invented while employed with DuPont.

6. I consider myself to be an expert in the field of sharpening devices.

7. There are three common techniques used for sharpening tools, such as knives, namely a) abrasive sharpening, b) steeling and c) skiving.

8. ABRASIVE SHARPENING - The intent in abrasive sharpening of fine edge knives is to obtain an edge structure that in cross-section is V-shaped or of modified V shape where the resulting edge is as geometrically perfect as possible. Abrasive sharpeners use abrasive stones, surfaces coated with abraeives or use shaped hardened abrasive surfaces intended to rapidly remove significant amounts of material, generally metal, from the plane of the edge facets that intersect to form the edge. Abrasive sharpeners may be considered as devices which use abrasive surfaces to create specific geometric shapes along or across the facets that create the sharpened edge by abrasively removing material from the facets along the knife blade edge.

9. STEELING - A second common technique is

"steeling". Although the perceptions of conventional steeling vary widely, it has been generally believed that a non-abrasive manual steel may be used to straighten the burr created by abrasive sharpening and to align the burr (which is an extension of the edge) with the central axis of the edge or to remove the burr. The conventional steel does not have an abrasive coating on its surface, but is constructed entirely of a hardened material. Explanations commonly found in the published literature to explain the action of the unguided manual steel (sometimes magnetized) are as follows:

a. Realigns and smooths the edge.

b. Realigns molecules along the blade's cutting edge.

c. Realigns the blade.

d. Magnet aligns metal molecules.

e. Eliminates microscopic curl caused by impact cutting.

f. Realigns the blade and is not actually sharpening.

g. Steels do not sharpen, they hone or straighten an edge that's gone out of "tune".

h. Reestablishes alignment of sharp edges knocked out of alignment or bent to one side with use.

I. Coaxes the edge back in place.

j. Does not sharpen but straightens out the curl and realigns edges.

k. Tones the blades.

l. Magnetized to remove burrs.

10. SKIVING - The skiving techniques involve forming a new edge by removing in entirety the surface of old facets and replacing them with new facet surfaces commonly created at a poorly defined angle. Skiving is described in the present application in the last paragraph of page 11 extending over to page 12. As explained in the specification, skiving sharpeners include those which utilize a very sharp edge or interdigitating sharp edged wheels or corners of hardened metal or ceramics. Skiving could be analogized to wood planing where in skiving, one stroke can remove an entire thin film of metal from the facet surface.

11. Before the time of my involvement in the development of sharpeners (at least as early as 1984) I have been aware of steeling techniques.

Until decades later at the time of the invention of the present application, however, it was not obvious to me that if a precision guide were associated with a hardened surface, such as the steels used in steeling techniques, and if the steeling angle could be consistently controlled stroke after stroke that a unique blade edge would be created, one having relatively uniformly sized and spaced microserrations; and that this type of edge could be recreated after being initially dulled from use. This was a surprising discovery because to the best of my knowledge there was no realization that a microserrated blade edge could be obtained by steeling. In that regard, as I pointed out above, the general intent of abrasive sharpeners is to obtain a perfectly geometric V-shape. The basic intent of manual steeling is generally believed to be to straighten or remove burrs that result from abrasive sharpening. The basic intent of skiving is to remove on each stroke an entire layer or film of metal. None of these techniques was intended to form a microserrated edge.

12. The present invention represents a unique

technique for sharpening. It is what we have described in the present application and claims as a "conditioning" apparatus in order to emphasize that this apparatus differs from both abrasive sharpening and conventional steeling and that the resulting edge is repeatedly reproducible and very different. The present invention differs from abrasive sharpening in that it does not utilize abrasive materials to achieve its result. Similarly, the present invention differs strikingly from steeling, as it has been practiced in the past, in that this invention incorporates highly precision means for controlling on every stroke the angle between the facet along the knife edge with the surface of a hardened material. It differs more fundamentally in that the present invention creates a novel, highly reproducible and unexpected row of microscopic serrations along the knife edge. The uncontrolled angles and inconsistent forces involved in conventional manual steeling prevents the consistent and reliable formation of this new highly desirable edge. Steeling has been used after the knife edge has been sharpened to straighten, realign and

smooth the edge, and also to remove burrs especially when magnetized. The present invention, in contrast, will create a relatively uniform and novel row of microscopic teeth along the edge and recreate those teeth when the edge is dulled from use. The physical phenomena responsible for the creation of these microscopic serrations or teeth along the knife edge is a carefully controlled and repetitive very localized bending of the edge back and forth along the abrasively sharpened edge especially after the burr is removed. This repeated bending in opposite directions causes stress hardening and embrittlement of the metal along the edge itself which causes cracks to occur perpendicular to the edge and fracturing of small sections of metal between the cracks so formed. Small sections of metal then fall off between the cracks leaving the tooth-like microscopic serrations along the edge.

13. The present invention is thereby based upon the ability to obtain a microserrated edge through the use of a precision guide for a hardened surface which does not have the characteristics of abrading, skiving and metal removing tools. In

order to achieve these results the present invention uses a combination of various features such as having the object with the hardened surface be static or non-motor-driven. In addition, the hardened surface is non-planar and of non-extended shape where it contacts the edge of the blade to locally stress and fracture the edge of the blade by repeated stroking to thereby result in a microscopic serration along the blade edge.

14. In rejecting the claims in the last Office Action, the Examiner concluded that it would have been obvious to use in the abrasive sharpener of my U.S. design patent Des. 368,217 ("Friel") a non-abrasive hardened object for the sharpening tool in view of Edling 4,285,253. I do not agree with this conclusion for a number of reasons. First of all there would be no motivation to make such a combination. In addition even if Friel were modified simply to use a hardened object of the same shape as Friel's abrasive sharpening tool, such combination would still not result in the present invention. It would not be obvious from Friel and Edling to further modify such

combination in order to result in the present invention and undue experimentation would be required to result in the present invention.

15. Friel (which is similar to my U.S. 5,390,431) discloses an abrasive knife sharpener which uses a pair of rollers as the guide structure. The abrasive sharpening tool is in the form of an extended abrasive coated V shape structure. (U.S. 5,390,431 shows the sharpening tool as a pair of elongated interdigitating abrasive members.) The purpose of the Friel sharpening tool is to form a V-shaped blade edge characteristic of what results from abrasive sharpeners. The sharpening tool is not of non-planar and non-extended shape and would not locally stress and fracture the blade edge by repeated stroking. This is not surprising because there is no intent to create a microserrated blade edge. Modifying the structure of Friel to create such an edge would be contrary to what in this instance is sought by Friel - namely, a nominally perfect blade edge of V-shape.

16. Edling describes a mechanical steel wheel for sharpening blades. The Edling device uses motor driven disks 11,24, each having a smooth

peripheral edge 12. The intent of the device is to sharpen "the blade to a smooth, fine finish" (Col. 3, lines 24-34) The Edling patent also discloses the provision of a "knife-guiding means 16" having a rounded edge 34. Clearly Edling does not suggest a precision contacting guide. The use of disks having rounded edges and non-contacting knife guiding means having rounded sides or edges is specifically stated by Edling to "enable the blade 18 being sharpened to be drawn through the knife receiving-spaces at a variety of angles instead of only at right angles to the disks 11 and 24, as would be required if no rounding was used" (Col. 4, lines 46-53) Figures 2 and 6 of Edling also illustrate the actual use of the Edling device where the knife blade 18 clearly does not have the blade face in contact with any guide surface and particularly with any planar guide surface. In contrast, the present invention uses a contacting precision knife guide in order to assure that when the face of the blade is moved across the planar guide surface the blade will be precisely at the same angle each and every time. Such precision guide is not possible with the

Edling device.

17. Among my patents relating to sharpeners are U.S. 5,611,726; 6,012,291; 6,113,476 and 6,267,652. Each of these patents discloses a truncated cone in combination with a guide member. In each of these patents, not only is the truncated cone an abrasive sharpening tool, but also the truncated cone is motor driven. There is no disclosure in any of these patents of reproducibly creating a uniformly microserrated blade edge and the structure of each sharpener would not create such an edge. Accordingly, these patents provide no guidelines for suggesting features that might be used for obtaining a microserrated blade edge.

18. The features of the invention I have described above would not have been obvious to a person of ordinary skill in the art for various reasons. At the outset, one of ordinary skill in the art would not have been aware that a microserrated knife blade edge could even be obtained. In addition, because the various sharpening techniques, such as in Friel and Edling, have distinctly different purposes, there would have been no motivation and therefore it would not have been obvious to

combine features of one type of technique (such as a precision knife guide used in abrasive sharpening) with features of other techniques, such as using a substantially non-abrasive hardened surface, much less a hardened surface which is static or non-motor-driven (Edling's sharpening disks are motor driven) in order to create the microserrated edge upon repeated stroking at precisely the same controlled angle. Having the hardened surface object non-motor-driven is important. In that regard, even if the hardened surface were nominally smooth, it inherently would have some imperfections which could create some abrasive action when motor driven and thereby not obtain the desired microserrated edge. It also would not have been obvious that such hardened surface should be of a shape which would locally stress and fracture the edge of a blade at the location of contact by the repeated stroking. Such hardened surface should thereby be of non-planar and non-extended shape. Preferred shapes would be arcuate such as the hardened surface of a cylinder. Stated another way if Edling is being relied upon simply for a

suggestion of making the abrasive surface of Friel smooth, then such surface would not be of non-planar and non-extended shape so as to locally stress and fracture the blade edge. If, on the other hand, the entire Edling hardened surface disk were being substituted for the abrasive sharpening tool of Friel, the hardened surface would not be static or non-motor-driven because the Edling disks 11 and 24 are driven by motor 14. In addition, Edling requires his motor driven disks to be associated with knife guiding means 16 which have rounded sides or edges 34 and do not provide a precision guide having a planar guide surface. As a result, even if Friel and Edling were combined, such combination would not produce a microserrated edge and would structurally differ from the present invention.

19. It is also my opinion that undue experimentation would be required by one of ordinary skill in the art to result in the invention of this application. In that regard, because obtaining a highly regular microserrated edge was not, to the best of my knowledge, even known and certainly any means of predictably achieving such an edge was

unknown, there would be no reason for one of ordinary skill in the art to begin any form for experimentation to determine what combination of features would be necessary to create such a microserrated edge. For much the same reasons as to why the invention would have been unobvious, there would be no motivation to direct one of ordinary skill in the art as to how to experiment in order to obtain the combination of features that is involved with this invention. The various features described above with respect to this invention cooperate to create the microserrated edge. Since the prior art does not provide any suggestions as to how such an edge might be created, undue experimentation would not only be required, but any expectation of creating such on edge would be completely unreasonable. The fact that a highly regular microserrated edge could be produced was a total surprise to me. The prior art could not provide any guidelines for obtaining a type of edge that was not even being sought by the conventional sharpening techniques.

20. In summary, if Friel were being modified in view of Edling to have the planar sharpening member of

Friel smooth instead of abrasive, the sharpening member would still not be of non-planar and non-extended shape which would locally stress and fracture the blade edge. Experimentation would be required on how to modify the shape of the Friel sharpening member to create a microserrated blade edge. Since obtaining a microserrated blade edge was not a goal of the Friel sharpener, such experimentation would be undue experimentation and would also be unreasonable and unobvious because there would be no motivation to change the shape of the Friel sharpening member to obtain a type of blade edge not intended by Friel. Conversely, if Friel were being modified in view of Edling to substitute the entire Edling sharpening tool (smooth motor driven disks) for the Friel sharpening tool, such substitution should also include the imprecise non-contacting Edling guide having rounded sides since Edling uses the disks with rounded edges "in conjunction with the rounded sides 34 of the knife-guiding means" to achieve his intended results. (Col. 4, lines 46-53) Experimentation would be required to ultimately change the disks from being motor

driven to being static (non-motor-driven) and to ultimately change the guide from one having rounded edges to a precision guide having a planar guide surface in order to create a microserrated blade edge. Such experimentation would be undue experimentation and would be unreasonable and unobvious since there would be no motivation to experiment on making changes to a combined Friel/Edling device in order to achieve a microserrated blade edge when neither Friel nor Edling has that type of blade edge as its goal.

21. The present invention is embodied in Edgecraft's Model 470 and Model 130. At the time of its introduction to the trade in April 2004 there were no other products on the market having a steeling type sharpening member in combination with a precision guide in the manner of this invention and of commercial Models 470 and 130, despite the fact that steeling devices have been ubiquitous and the fact that abrasive sharpeners having precision guides were known for many many decades. Since the time of its first shipments in July 2004, Edgecraft has sold a total of approximately 10,000 collectively of these Models 470 and 130 products in the United States and Europe.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

dated: 8/10/05

Daniel D Friel Sr
DANIEL D. FRIEL, SR.

@PFDesktop\::ODMA/MHODMA/IMANDMS;CB;405811;1

FRIEL-105

I hereby certify that this paper, along with any other paper or fee referred to in this paper as being transmitted herewith, is being deposited with the United States Postal Service with sufficient postage as First-Class Mail in an envelope addressed to: Commissioner of Patents and Trademarks, P. O. Box 1450, Alexandria, VA 22313-1450 on this 12th day of December, 2005.

By: _____

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DANIEL D. FRIEL, SR., ET AL.	
SERIAL NO.: 10/803,419	Art Unit: 3723
FILING DATE: 03/18/04	Examiner: Hadi Shakeri
FOR: PRECISION MEANS FOR SHARPENING AND CREATION OF MICROBLADES ALONG CUTTING EDGES	

Hon. Commissioner of Patents
and Trademarks
P. O. Box 1450
Alexandria, VA 22313-1450

SECOND DECLARATION OF DANIEL D. FRIEL, SR.

DANIEL D. FRIEL, SR., hereby declares:

A. I am one of the named inventors for the above identified application.

B. I have previously presented a Declaration in this application.

C. I have reviewed the Office Action of September 26, 2005 and I make the following observations.

1. On page 3, paragraph 2 of the Office Action, the Examiner asserts correctly that Edling achieves a fine smooth finish by a non-grinding means of utilizing a hardened object.

   Response: However application Claim 63 claims the creation of a very different edge, not a smooth edge but "to create a microscopic serration along the edge." A very different edge is created by Claim 63 because it utilizes extremely precise control of angle, a non-moving hardened surface, and a different surface geometry on the hardened surface. Edling can not achieve a microscopic serration.

2. On page 3, paragraph 2, the Examiner agrees that Edling uses "a motor driven object".

   Response: The Examiner should realize that the technologies of motor driven and manual sharpeners are very different and achieve very different results. Motor driven devices are prone to polish and that is what Edling achieves.

3. On page 3, paragraph 2, the Examiner continues "Edling describes a superior finish by using a steel."

   Response: Edling does not achieve a superior finish. His

polished finish is considered inferior by many chefs. Edling cannot demonstrate that he can achieve his results even if the motor is off. His apparatus is incapable of demonstrating the development of microserrations.

4. On page 3, paragraph 2, the Examiner continues "Edling discloses a preferred embodiment of mechanical means."

Response: Edling does not disclose a preferred embodiment that will reproducibly create a microserrated edge. His equipment is crude by modern standards in that it lacks precision angle control in any coordinate. He orients the blade entirely by hand support without a physical reference plane and hence randomly positioned in space. The fact that the edge touches his rotating wheel does not orient the face of the blade or facets in any plane. Hence the angular control is non-existent. Saying he has a guide is clearly a gratuitous statement by Mr. Edling for he has none that controls the blade or facet angle.

5. On page 3, paragraph 3, referring then to Leong the Examiner states "Leong teaches sharpening a knife by manual means. It would have been obvious to one of

ordinary skill in the art, at the time the invention was made to modify the invention of Edling by using a manual means as taught by Leong e.g. to save cost."

Response: Leong like Edling does not have precision angle control when using the steel. In fact Leong also lacks angle control of the blade facet when abrasive sharpening. Like Edling, Leong's design assures that the knife edge can touch the hardened steel surface. However, Leong advises that when steeling (lines 23-26) "it (the blade) is finished by pulling it across one side of the hone 4 and the wheel 9 as indicated by the dotted lines 16 and then across the other side of the hone and the wheel 10 as indicated by the dotted line 17."

It is obvious to anyone skilled in the art that (see Figure A attached, which is an enlargement of Leong Figure 1) the angle of the knife face and the angle of the knife facet relative to the steel are uncontrolled as taught by Leong. Only the line of the edge line itself is positioned. There is no angle control of the facets. It is clear that Leong exercises no angle control for the facet during either

sharpening or finishing. Spacial alignment of the edge is totally irrelevant to angular control of the facets. It is the angular control of the plane of the facets when abraded and when finished that matters in edge formation and in the quality and nature of edge created.

When Leong is sharpening (abrading) the face of the blade is not aligned with any surface. Consequently the face can be rotated angularly sufficiently to literally abrade the blade face against the side of the abrasive wheels 9 or 10. Likewise when Leong is finishing the edge, the face of the blade is not angularly aligned with any surface and the facet angle is consequently totally uncontrolled.

In fact, Leong invites a disastrous situation. The blade face can literally be aligned accidentally or intentionally flat against either the surface of the abrasive wheel 9 or 10 or the blade face can be aligned with the surface of the hone 4. In either of these situations the edge itself (the line where the facets meet) will bear directly on the abrasive

surface or be rubbed directly against the surface of the steel and be fatally blunted. The Leong design radically instructs the user to finish the edge by aligning and pulling the blade across and in contact with one side of the hone and the wheel as indicated by dotted line 17. Any physical effect that the steel 4 would have on the edge itself would be totally obliterated as that edge and the opposite facet pass across and in contact with the abrasive wheel and are abraded by the abrasive surface 10. Further, whatever the steel does to a facet on one pull in completely obliterated on the next pull as that facet is abraded by the abrasive wheel. There is absolutely no way that the microserrated edge sought by the present invention would be created by either Leong or Edling or any combination thereof.

6. On page 3, paragraph 4, the Examiner continues "regarding claims 64-79 and 83-86 Edling as modified by Leong meets all the limitations e.g. elongated flat surface (Edling 34)..."

Response: The surface 34 of Edling is not an elongated flat surface. (Line 15 column 4) He

specifically states that the guide is not flat, instead "Preferably the edges 34 are rounded as illustrated." (emphasis added) Likewise Leong does not have an elongated flat surface or in fact any surface to guide the face of the blade. While the line of the edge is aligned, the angle of the face of the blade and the angle of the facet are allowed to be oriented or moved at total random. Neither Edling nor Leong has any precision angle control and consequently neither could create the type of edge conditioning necessary to generate the microstructure along the knife edge as discovered by us and as is the subject of this invention.

7. On page 3, paragraph 5, the Examiner continues "Leong discloses a sharpening apparatus and method meeting all the limitations of claims 63 and 83, except for disclosing a harden object."

Response: No. Leong does not disclose a precision knife guide having a planar knife face contacting surface. (See application claim 63). Surely Leong is not teaching that the face of the blade should be held in sustained moving

contact with the surface of the abrasive coated cylinder. He doesn't preach that and it would of course be a nonsense act that would simply destroy the face of the blades. No one skilled in the art would imagine using an abrasive surface as a guide for the face of a blade.

Response: (Relative to Claim 83) Again Leong does not have a precision knife guide having a planar knife face contacting surface.

8. On page 4, paragraph 3, the Examiner states "Friel meets all the limitations of claims 63 and 83, i.e., knife-edge enhancing or conditioning apparatus and method having a precision angle guide, except for disclosing a hardened object for the sharpening tool."

Response: Based on the common meaning of words as used and recognized by prior patent art and customary usage, the referenced Friel patent does not disclose a knife-edge enhancing and conditioning apparatus but a device for conventional sharpening. The Friel device does have precision knife guides but there would be nothing obvious about eliminating the abrasive action of Friel's abrasive covered metal structure. If one did eliminate the abrasive

and used the underlying metal structure identical to Friel's shape (hardened or not) it would not accomplish what we have now discovered - namely the microserrated structure.

It is important that the referenced Friel patent sharpens both sides of the blade (both facets) simultaneously. There is no way to do that while involving either the Edling or Leong device.

If the Edling wheel (hardened object) were put into the Friel patent's guide structure one would not get a microserrated edge. And of course the Friel patent is not looking for an Edling smooth finish type edge. It would not have been obvious, (contrary to the Examiner's claims) to modify the Friel patent by substituting the hardened object as taught by Edling because the Friel patent specifically did not want to create a fine smooth edge.

9. On page 4, paragraph 4, the Examiner again states, "Edling teaches achieving a fine smooth finish by a non-grinding means of utilizing a harden object. It would have been obvious to one of ordinary skill in the art, at

the time the invention was made, to modify the invention of Friel by substituting the sharpener with a harden object as taught by Edling to obtain a smooth finish."

Response: This is nothing obvious about this to anyone, skilled or not.

Edling preached that you must have very poor angle control (Column 4, lines 46-54) in order to achieve his result of a smooth finish edge. So, why would anyone want to mate his wheel, etc. with a precision guide? Edling promises you it will not work. That is, you will not get a smooth edge.

Similarly if someone replaced the Friel abrasive with the Edling hardened object, nothing would happen. You would get neither a smooth edge nor a microserrated edge. These arguments do not describe a means to duplicate the present invention. Further the Friel reference sharpens both facets simultaneously. Thus, the Edling wheel cannot be used.

10. On page 4, paragraph 5, the Examiner adds "Regarding Claims 64-68, 70-75, 77-79 and 84-86, Friel as modified by Edling meets the limitations, as noted above and in previous office actions."

Response: This is repetitious of the Examiner's first comments except for Claims 63 and 83. Clearly Edling does not use a precision guide and instead he argues that he requires poor angle control to get his type edge. Edling uses a motor driven, not static, hardened surface. Edling's apparatus does not stress harden the edge and consequently he does not obtain a microserrated edge; his apparatus will not do that and cannot.

D. I have reviewed Claim 87 which I understand is being added by amendment to this application. Claim 87 relates to the spacial relationship of our elongated guide and the shaped hardened surface which should be such that the moving edge is repeatedly wedged against the shaped hardened surface and locally stressed by the wedging action at the point of contact until the stress hardening of edge causes the edge to fracture into a microserrated structure. (See attached Figure B.)

The shaped hardened surface should be sufficiently close to the elongated guide surface that the shoulder on the blade face (where the facet attaches to the blade) acts as a fulcrum to leverage and magnify the force of the hand (holding the blade down and against the guide) into a very large stress on that small contact area between a portion of the edge facet and the shaped hardened object. If you assume a facet length of .020"

and a contact area of 0.005 x.007", a force of one ounce at the top of a 1.5" wide blade would multiply into a force of 1.500/.020 X 1 oz. = 75 oz. which is about 5 pounds which on that area of 0.000035 inches square is equal to 140,000 pounds/sq.in. This stress level exceeds the strength of steel at room temperature and can readily stress harden or fracture the edge. Note that the calculated 5 pounds (above) corresponds closely to the optimum resistant force we measured at 1-3 lbs. (specification page 22, lines 10-11 and page 6 midleft column - published application.)

In actual practice of our sharpener we scallop out an arcuate recess in the guide surface to accept the rounded steel so that this leverage and forces are fully realized.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

dated: 12/6/05

Daniel D Friel

DANIEL D. FRIEL, SR.

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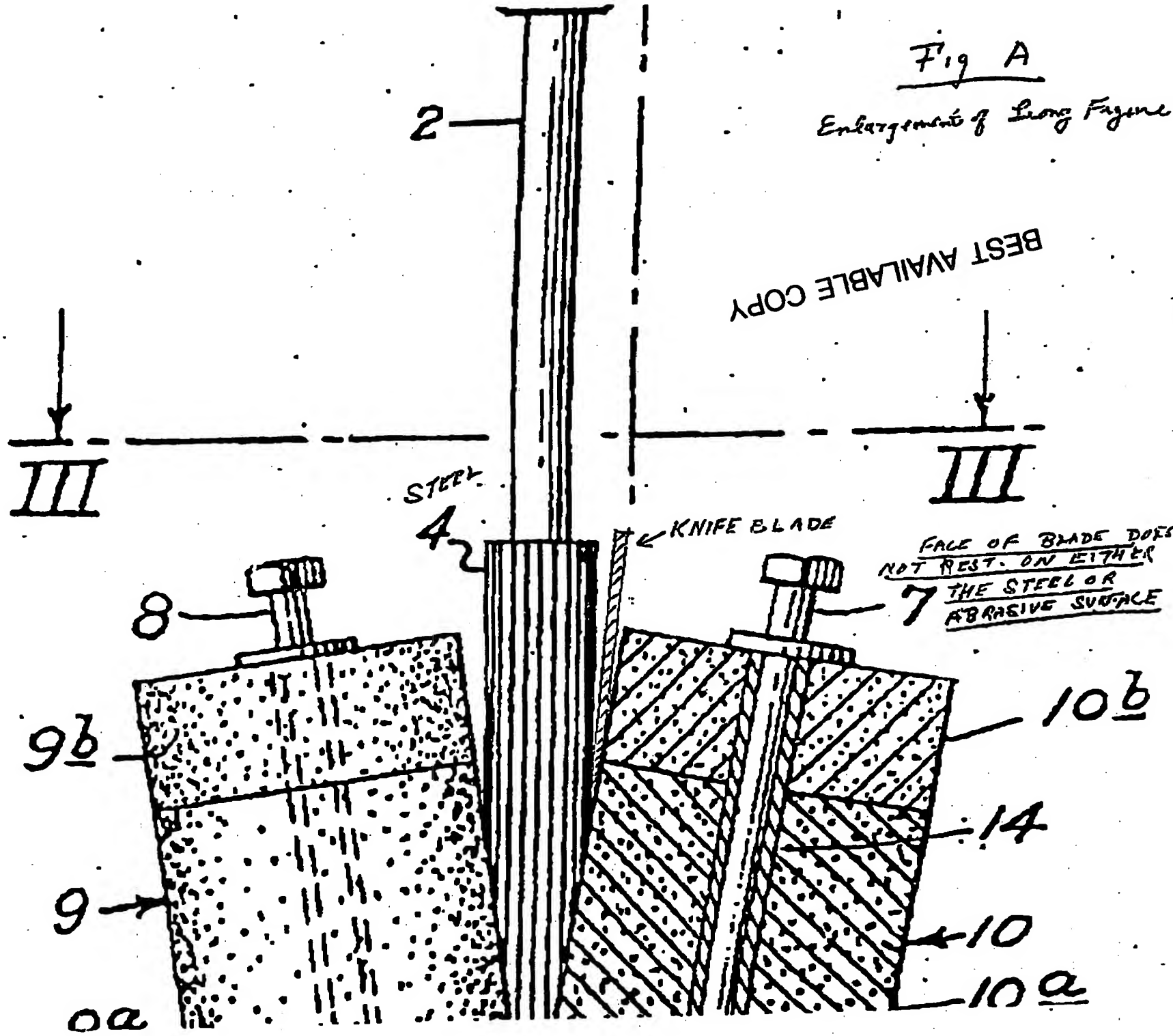
Fig A

Enlargement of Long Figure 1



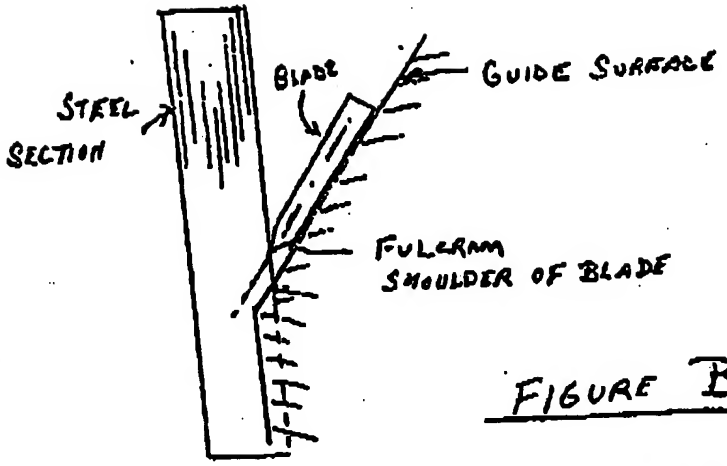


FIGURE B

(SEE OUR FIGURE 11)

APPENDIX III

RELATED PROCEEDINGS

Appellants are not aware of any related proceedings.